

Claims

1. A method for regulating the charge of an internal combustion engine (1), to the combustion chambers (3) of which
5 is fed a combustion air mass flow that is regulated to a setpoint air mass flow (SMF) by a first and a second actuator (8, 9) which are controlled with respect to their position, the second actuator (8) being arranged downstream of the first actuator (9) within the air mass flow and having an upper
10 limit position in which it is open to the maximum and a lower limit position in which it is closed to the maximum, the actual rotational speed (N) of the internal combustion engine (1) being detected, and a setpoint intake pipe pressure (SP) being predefined for
15 controlling the first actuator (9), wherein as long as the second actuator (8) is not in the lower limit position, the setpoint intake pipe pressure (SP) is determined by means of a rotational speed-dependent characteristic map (21) for which the setpoint air mass flow
20 (SMF) is not an input parameter, the setpoint intake pipe pressure (SP) being limited to an intake pipe pressure minimum value (PMIN-V) that can be achieved for the current setpoint air mass flow (SMF) with second actuator (8) set in the upper limit position.
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2. The method as claimed in claim 1, wherein an invertible numeric mass flow model (25) is used for calculating the intake pipe pressure minimum value (PMIN-V), for which the position of the upper limit position of the second actuator
30 (8) and the setpoint air mass flow are input parameters.
3. The method as claimed in claim 1 or 2, wherein a setpoint intake pipe pressure (SP) that is dependent on the setpoint air mass flow is used when the second actuator (8) is sitting
35 in the lower limit position.

4. The method as claimed in claims 2 and 3, wherein the setpoint intake pipe pressure (sP), dependent on the setpoint air mass flow, as claimed in claim 3 is determined using the mass flow model as claimed in claim 2, for which the position
5 of the second actuator (8) in the lower limit position and the setpoint air mass flow are input parameters.

5. The method as claimed in one of the preceding claims, wherein to control the second actuator (8), an inversion (28)
10 of the numeric mass flow model (25) is used that determines a setpoint position (sV) of the second actuator (8) from the setpoint air mass flow (sMF) and the actual intake pipe pressure (iP).

15 6. The method as claimed in one of the preceding claims, wherein to control the first actuator (9), a model (26) is used that determines a setpoint position (sD) of the first actuator (9) from the setpoint air mass flow (sMF) and the setpoint intake pipe pressure (sP).

20 7. The method as claimed in one of the preceding claims, wherein the mass flow model (25) has a monotonic characteristic curve that links the position of the second actuator (8) with the air mass flow (MF) and the intake pipe
25 pressure (P).

8. The method as claimed in one of the preceding claims, wherein the first actuator (9) is actuated in order to regulate the setpoint air mass flow (SMF) when the second
30 actuator (8) is set in the lower limit position.

9. The method as claimed in one of the preceding claims, wherein a throttle plate (9) located in an intake tract is used as the first actuator, and inlet valves (8) with variable
35 travel adjustment are used as the second actuator.

10. The method as claimed in one of the preceding claims, wherein the setpoint air mass flow (sMF) is derived from a driver request signal.